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THE DENTIST.

O. A. JARVIS, M.D.S.

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THE DENTIST.

A POPULAR TREATISE ON THE CARE OF THE
TEETH.

SECOND EDITION.

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BY

O. A. JARVIS M.D.S.



NEW YORK :
PRESS OF S. W. GREEN'S SON, 74 PEEKMAN STREET.

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THE DENTIST.

INTRODUCTION.

A few comprehensive remarks concerning health in general will assist us very much to understand the suggestions about the teeth. There seems to be a time-honored superstition that disease, sickness and death, are matters of "chance" or "Providence." Often do we hear quoted, from "high places," the language of Eliphaz, "affliction cometh not forth of the dust, neither doth trouble spring out of the ground:" which is as void of truth or inspiration as when he says in the previous chapter, "whoever perished, being innocent? or where were the righteous cut off?" In the same connection we hear, "shall there be evil in the city, and the Lord hath not done it:" which is a misreading of the original, and a perversion of the sense. Such teaching indicates a desire, and is a supposed successful attempt, to shift the responsibility, and justify ourselves. That our health is in our own keeping is susceptible of such abundant proof, and has been so thoroughly demonstrated, that it will not admit of denial. And we are responsible therefor; individually, in given cases; collectively, in others.

When we consider the vastly greater value of health, is it not strangely inconsistent that it is not made as much a subject of study as mathematics or music? What an immensely greater proportion of time, thought, care, is given to dress, than to health. Such folly is only equalled by charging the Lord with our ailments, which charge is an insult to common-sense, and a reproach to our Maker.

When we say that sometimes circumstances for the time being are beyond our control; and that there may be a special interposition of Providence in any given case; we have said all we are warranted in saying, and perhaps more than we *know* of either proposition.

Let it be clearly understood, then, that we start out with the conviction that the evils to which the teeth are subject are as much within our control as any other human affairs.

Perhaps a chapter on the selection and preparation of food, the supply of "bone material," etc., may be expected. But as individuals, and especially those who most need such information, have very little control over such matters, it must suffice to say that we must take our food very much as we do the weather, just as it comes, and accommodate ourselves to it the best we can, for the present.

I have aimed, as in my former treatise on the subject, to present, not the theoretical, professional, or scientific, but the purely practical, just what I have to tell to patients in part every day.

Leaving to the older professions all the interests

involved in the subject prior to the eruption of the deciduous teeth (and they are often of controlling importance), I will endeavor to direct the reader forward from that period as intelligently as possible.

THE FIRST SET OF TEETH.

"Baby's teeth." This chapter is for parents only. In accepting "the situation" we accept the responsibilities. There are none more absolutely ours; none more sacred. We may neglect any others sooner than these.

"Baby has a tooth! baby has a tooth!" Papa must come and see it: everybody must come and see it. Why? Not simply because it marks a stage in the interesting process of development, but because "it is a thing of beauty," and it may be "a joy forever." As it comes into the world and our keeping with all its sparkling loveliness and purity, it would seem that only our own folly could even in imagination invest its future with darkness, decay, and death.

The means necessary to ward off the evil are so simple that it seems almost trifling to name them. Grant that they are childish: it is as rational and necessary to take care of the baby teeth as to take care of the baby man.

This is a duty to be done by the nurse, whether the nurse be the mother or somebody else. Who will instruct the nurse? Any intelligent dentist will. This chapter is for that express purpose.

In order to present this subject more clearly and

forcibly to the mind of the reader, I will describe two extreme cases, the first showing the results of simple care, and the other of mere neglect.

But a few days since a young mother called in my office with her two little girls, one five years of age, and the other seven. They were cheerful and playful, with not a thought of anything unpleasant. Upon the most careful examination of the teeth, I found absolutely nothing the matter with them; no decay even in the fissures, where we usually expect to find it; not a dark spot, or an imperfection of any kind; and the gums as clean, beautiful, and healthy, as the teeth. A number of the second set had made their appearance, free from all dread of forceps or excavators, rejoicing as if they had come into a world of peace and pleasure.

Nothing to do! The dentist's occupation is gone. Ten thousand such patients would not give a dentist a living. Mark what the mother said: "It is all because of what you told me years ago. I have done just as you told me." This was the first time I had ever seen the children, or that they had ever been in a dentist's office.

Now look at the contrast: To-day a mother, about the same age, and of fine appearance like the former, came in with her little boy, seven and a half years of age. The mother looked troubled, and the boy's face was red with weeping. When the lips were parted a scene was presented which beggars description, and calculated to strike terror to the dentist's soul, but beyond the comprehension of parent or patient. Even a partial description would be revolting. All the deciduous teeth

were in an advanced stage of dissolution; dead roots; gumboils; abscesses; swollen and sore gums. The six-year molars were hollow-ing with agony; others of the second set were making their appearance, with faces a little whiter, but sad and sorrowful, evidently expecting a hard time of it. Now this mother had received the same instructions, and at about the same time. Inherited or transmitted diathesis was apparently as favorable in the one case as in the other. The simple fact is the boy's teeth had never received any care or attention. "Care will pay;" and "blood will tell." Certainly there are exceptions, or cases where, after all has been done that could reasonably be required, the teeth will fail and be lost, and apparently nobody to blame. But proper care is so effectual that even a very poor set of teeth may as a rule be preserved indefinitely.

The teeth are naturally so formed as at certain places to invite decay. It is just as much expected that they will decay at those places as it is that a child will have the measles or the mumps. Now in case the teeth of those little girls were decayed at the points alluded to, it would be an easy, painless, cheap, and durable operation to fill them; and all because of the care taken of them, and the limited extent of decay. But with this boy everything is different. His general nervous system is out of tune—outraged—the general health is below the normal standard as a consequence; every part of the mouth is sore; the inflamed gums are exquisitely so; the tooth substance is infinitely more so. When a mouth is brought to the

dentist in this condition, he must be expected to use some charm, work a miracle, or use physical force. He will prefer either of the others rather than the latter. It is not desirable to make a "slaughter-house" of his office, or to make it like the place where there is "weeping and wailing and smashing of teeth." He does not care to be called "a butcher," nor to secure the life-long hatred of the patient.

This, though not unusual, is a very "sick" case, and requires more protracted treatment, by which the mouth may be brought to a healthy and comfortable condition, but still will leave more or less deformity of the parts.

It is presumed we are all ready to repeat the experience first described. To do so we must bring the babies: commence about nine o'clock in the morning: bring them in arms, and bring them in coaches; bring them in baby-wagons, and send them afoot. Let their music mingle with the sunshine. And while the walk is lined with waiting vehicles, and a score or more of little ones are making mischief among the machinery of a dentist's office (for the use of which they are less likely to have occasion), I will place them, one by one, in an easy-chair, and, with a small, soft brush, and just a touch of Lyon's exquisite dental cream, I will show the nurse how to secure all the happy results of which we have spoken. The dental cream is excellent, as it does not spill over the dress, and the flavor is pleasing to the child. It is seen that the manner of using the brush is easier shown than described. For the older ones, where

the teeth are longer, we will also use this thread of waxed floss silk to clean and keep a polish on the surfaces which are in contact, for, as you can see, the brush cannot reach those surfaces. For the little short ones the brush alone is sufficient, used with a rotary motion. Now good-by; and bring in the little patient again next Monday morning at eleven o'clock. And if you have followed directions carefully, I will say, well done, good and faithful nurse; if not, I will repeat the lesson, interspersed with a little scolding, and another fee.

Learn the little patient as soon as may be to brush its own teeth, and use the pick after every meal, repeating the lesson occasionally yourself.

In this manner I can save more teeth, using no instruments but the brush, pick, and thread (by way of instructing others to do so), than all the dentists in the city by simply performing the usual dental operations.

It must not be inferred from what has been said that we can by any means always or in every case avoid the necessity for "filling" children's teeth, especially at the points spoken of as being already imperfect. But when cared for as directed, the defect would be detected at so early a stage that the operation for repair (filling) would be painless, not tedious, involve but little expense, and its durability would be beyond all question.

If they are not filled, the mouth will be foul and unhealthy while decaying; the lips and tongue will be irritated, often severely, by the rough and ragged edges presented; the decay will be likely

to reach the pulp, causing excruciating pain, the death and premature loss of the tooth, and lasting injury to the jaws and the position of the incoming set.

The child will not and cannot chew on sore gums and teeth: the food will be put down and out of the way as soon as possible, without the necessary preparation for the stomach, and the result is early dyspepsia with its train of horrors.

The point of paramount importance which I wish to urge in this chapter is that the teeth should be kept clean *from their first appearance through the gums*, no matter how young the child may be, even if born with teeth, as some are. They should be as scrupulously cleaned as the cheeks, the eyes, or the ears, for they will suffer more from neglect, though milk be the only food for the younger years. The brush is the only thing that will do it.

REMOVAL OF THE DECIDUOUS TEETH.

Nature has made provision for the removal of the first set of teeth by a painless and healthy process of absorption of the roots. And almost without exception they will absorb fast enough to keep out of the way of the incoming teeth of the second set. Watchful parents are much troubled when they see the new tooth apparently crowded out of the proper line by the old one, and they want the old one removed at once. This is *sometimes* necessary, but is very seldom done except by ignorance or overpersuasion; and may result in serious and lasting injury to the patient. Even

crowding during the growing age is accomplishing a purpose. It is positively necessary that the dentist should see the case as often and do with it as he thinks best, for the reason that changes are rapidly taking place which may change the position of affairs favorably or otherwise in a few weeks. When the natural process of absorption is not interfered with, the roots disappear, and the crown sits loosely on the gums, until it is easily removed with the fingers. This is not dying; there is no violence, disease, or pain; it is simply passing peacefully away, as we ought to in good old age. But if from any cause (sometimes by accident, but generally by decay) they become dead and a source of irritation, they should be removed immediately. To retain them when nature is making such an effort to get rid of them, is unwise, and productive of much harm to the other parts.

BRUSHING THE TEETH.

It may be that Nature did not intend people to brush their teeth, any more than for Adam to be clothed with fig-leaves. It is perhaps as natural as brushing the hair. Whatever may have been Nature's purpose, we know that the act of masticating the food would sufficiently cleanse the teeth if our food was less artificial. But as we find the teeth, with the frailties common to the interdependent human organisms, we must resort to artificial means for their protection. The brush is the most effectual for this purpose. It can save more teeth than the dentist can.

WHAT KIND OF A BRUSH: Not very stiff or very soft; but choose the medium. Large brushes are objectionable, unless for a very large mouth. A small brush will reach the various positions in the mouth better. If desirable to have the bristles of uneven length, chop them with the scissors. Any brush, especially a stiff one, should be rubbed back and forth on a brick or stone before using it at all, to take off the sharp angles from the ends of the bristles (see diagram, p. 53). Every one after using a new brush has been aware of sore gums.

HOW TO USE IT: The push and pull, or transverse movement, does very little good; while useful to a limited extent, much of it is likely to result in serious and lasting injury. The movement should be mainly from the gums toward the points of the teeth; rolling, and bearing on just hard enough to force the bristles between the teeth as far as they will go, but not hard enough to break down the bristles.

Be careful to reach the farther back ones, and the inside toward the tongue, and over the crowns, as well as the outside under the lips and cheeks. Take a hand mirror and look at them closely yourself, to see if you are accomplishing what you suppose you are. Don't be afraid to look at them—they won't bite, if you keep the mouth open. I have often thought that if some power the gift would give us to see our teeth as others see them, we would be more careful. To some persons it will seem unnecessary to give such particular directions about so simple a matter. But there

are many honest and intelligent persons who declare they brush their teeth faithfully, even two and three times a day, when we can find little or no evidence of the fact except on the points, likely already to be cleansed by the friction of the tongue and lips. The teeth and the dentist's reputation both suffer because they don't know "how to do it."

WHEN TO USE THE BRUSH: At night, before retiring. If it is well done then, it is not needed in the morning or any other time, with an ordinarily healthy set of teeth. Brush the tongue at the same time.

During the day the friction of the tongue, lips, food; and the glands pouring forth their fluids, washing the mouth like a running brook, produces all the *change* necessary to secure a healthy condition, by preventing a continued contact of injurious acids or substances with the teeth. At night it is the very reverse of this. The glands are inactive, the fluids unchanged; any particles of food, foreign or effete matter of any kind in contact with the teeth, aided by the warmth and moisture of the mouth, may undergo chemical change, and commence destructive action upon the tooth substance. It is an undeniable fact that the teeth suffer incomparably more during the night than during the day. And yet so many persons say, "I brush them in the morning because my mouth tastes so bad." And why? The dishes were put away without being washed.

In some cases it may be wise to brush the teeth oftener than once in twenty-four hours. But that

it can be and often is overdone, we have abundant evidence. Let any one who is disposed to argue the matter use the brush on the back of the hand three times a day, in the same manner and to the same extent as upon the teeth, and it will at least probably suggest caution.

DENTIFRICES, are almost a necessity. They are needed for polishing, and for their medicinal and antacid properties. Where a good dentifrice is habitually used we are not likely to find the teeth sensitive in operating. It is better to use it every night. Chalk in some form is the base or bulk of all good dentifrices. When properly prepared they are not likely to be used to excess. Charcoal and pumice, or anything else so coarse and cutting, is positively injurious for constant use. Any coloring matter is only to please the eye, and is rather an injury than otherwise. The flavoring may be mildly medicinal, or only to render it agreeable to the taste.

Some articles have been used and recommended very generally, even by dentists, which are now wisely discarded.

A very slight trace of soap in tooth-powder or tablets may be beneficial, but its free use is positively injurious to the soft tissues of the gums and teeth, making the former sore and the latter yellow. Anything like a "wash," or "lotion," should be used only in special cases, as a medicine.

THE TOOTHPICK, is a very necessary instrument. In case of the ideal, or perfectly natural set of teeth, it would be almost impossible for the food to be forced between them, so as to require

the use of the pick. But we have to do with "fallen nature." It should be used after every meal, aided by the lips and tongue in a manner which requires a little ingenuity, until all the food, whether soft or otherwise, is removed from between the teeth. In this manner *it can be done*; but it cannot be done with the brush. How long will people depend upon "rinsing" the mouth: "Take a little water in the mouth and shake the head." It would take the force of a hose-pipe to remove anything.

The quill pick is the best. As found in the shops it is not fit to use. Cut it one half narrower; clip the sharp point; and scrape the angles so they will not cut the gums.

Ladies complain that they have no pocket in which to carry a tooth-pick. In the pocket-book is a good place to carry it. It is no more "vulgar" to use a toothpick, and it is no more in the way than a cigar. It need not be done "before company."

THE THREAD, of waxed floss silk, charged with dentifrice, and drawn between the teeth, is the perfection of nicety, reaches the otherwise inaccessible surfaces, and is an almost infallible "life insurance" against decay in those positions. Once a week will do a great deal of good; once a day is sufficient. This also requires a little skill. After brushing at night is the best time. Linen thread or floss will do where the teeth are not crowded. Wax it as any other thread.

So many people say "I can't." No intelligent dentist will ever tell you to do what you can't do.

Pull a little harder, nearly straight, so as not to come down sudden and hard upon the gums. It will work easier by and by.

TARTAR.

The earthy or mineral matter held in solution in the fluids of the mouth is deposited upon the surfaces of the teeth. If not left long enough to become hard, it may easily be removed from all surfaces reached by the brush. If it collects upon any certain places, be assured the brush has not been there from the beginning. More or less other matter is likely to lodge with it, and thus we find it vary in density or hardness, as also in shade or color. The gums will be irritated by the rough surfaces and the acrid fluids held there. The evil in some cases extends until the teeth are entirely loosened from their sockets. When once hardened, it must be removed by the dentist, which is a careful operation. It then remains for the patient to prevent its accumulation. This requires a little extra care, as the gums will never form as perfectly around the teeth as they were originally. Yet they will heal "very nicely."

" If sloth or negligence the task forbear
Of making cleanliness a daily care ;
If fresh ablution, with the setting sun,
Be quite forborne or negligently done ;
In dark disguise insidious tartar comes,
Incrusts the teeth and irritates the gums ;
Till vile deformity usurps the seat
Where smiles should play and winning graces meet,
And foul disease pollutes the fair domain,
Where health and purity should ever reign."
" DENTOLOGIA,"

USING THE TEETH.

If any one cause is greater than another for the deterioration, the rapid decay, of the teeth, and why they are worse in this than in former generations, it is the fact that we have so little use for them, and use them so little.

This condition, in the absence of compensating care, is sufficient of itself to account for the destruction of teeth in this country. The construction and arrangement of the teeth for beauty and usefulness is as admirable as any other feature. With the exception that *present conditions* are far more unfavorable, they are no more subject to *failure* than the eyes, or the hair, or many other parts of the human body. American nerves are as much a failure as American teeth. It is the part of wisdom to find the *cause* and apply the *cure*, both of which are possible and practicable. A free, sensible use of the teeth will keep them comparatively clean, and secure their strength, and these two conditions will ensure their durability and freedom from disease. I do not say that in this manner we can cure all the ills which have accumulated during the ages, and are transmitted from generation to generation with increasing force. But where the general and particular conditions are good, the means named can be relied upon. As my present purpose is to *teach*, and not to *argue*, I will not burden the reader with the *proofs* of this or any other proposition, though they are at hand in convincing abundance. Strength and cleanliness are indispensable condi-

tions to any considerable degree of success and satisfaction. Otherwise the acknowledged frail machinery can only be "repaired," patched up," with more or less and perhaps entire failure. "When the foundations are destroyed, what can the righteous (dentist) do?"

The attention of the profession has been mainly directed for years past, and is at the present time, to this "repairing," the materials used and the manner of using them. "There is a time for everything;" and probably this matter of repairing the teeth has received only its due share of attention in the proper time. Indeed, we have sufficient reason to believe that the people were not prepared to accept the doctrine of "prevention" as true, much less to reduce it to practice. Possibly as a rule the dentist's instructions (which should be the most valuable part of his services) are disregarded.

The beneficial results of exercising the teeth are shown by the fact that the dentist can tell which side of the mouth is used the most, as he will always find it healthier, stronger, cleaner. But the necessity of exercise is too evident to need any illustration. Gymnastics and games of various kinds are practised to furnish exercise for other parts of the body, for people who have no employment which answers the same purpose.

How to get it, is the question. Among the essentials are intelligence, will, energy, and daily food. Then the teeth, jaws, mnsclcs, and glands can be provided with a good amount of exercise. But stop! It must be done right. That careless

way of doing it won't answer at all. Many a one has suffered from violent gymnastics. Be deliberate. Acquire speed slowly. Don't try to see how soon you can get it down. If it don't taste good in the mouth, it won't feel good in the stomach. The sense of taste is in the tongue. Enjoy it a reasonable length of time. Don't throw away the crusts, they give the most exercise, and are by far the most tasty, enjoyable part of the food. No food is fit to go into the stomach until it is thoroughly insalivated. To accomplish this, and the mastication of the food, gives the needed exercise. Don't chew with the mouth open; it cools the food, and don't look well.

How simple are these directions. As simple as to bathe in the Jordan. But if any reader should consider them silly, then please don't blame the dentist or be angry with the prophet, for "to this complexion we must come at last."

As these points are of so much importance, but so little observed, we may recapitulate: First; the flavor or taste of food is enjoyed only in the mouth, and by a due degree of comminution or mastication: Secondly; it is wholly unfit to be taken into the stomach until it is thus prepared and insalivated: Thirdly; the act tends to cleanse and polish the teeth: Fourthly; it gives strength and firmness to the teeth, jaws, and other parts involved, and a healthy action to the glands, membranes and muscles.

IRREGULARITIES.

When in their normal position the six upper front teeth lap over the corresponding six under ones; the first bicuspid strike between the cusps of the two under bicuspid, and so on, each tooth striking two antagonists, the cusps or points interlocking in regular order. But it is a very common thing to find variations from these positions; sometimes the entire arch, upper or under, too far in or too far out; sometimes one or more, most generally upon each side alike.

The *causes* are various. Sometimes the result of the premature extraction of the temporary teeth; more generally a lack of correspondence in size between the jaw and the teeth. And this last is evidently due to a great extent, at least in many cases, to the fact that there is no "call" or exercise for the *development* of the jaw, while the teeth are nearly their normal size when they take their position. Hereditary causes have much to do with this difficulty. The evils are numerous, among which the deformity is the most to be lamented. The interference with the movements of the lips and tongue; the effects upon the voice; the greater difficulty in cleansing, and the increased liability to decay, are some of the evils of this condition.

The treatment is more or less complicated, tedious, unpleasant, and expensive. Yet the irregularity can be remedied in the most of cases. The operation is usually deferred until the most of the teeth have taken positions, from thirteen to eighteen years of age.

WHEN DO THE TEETH DECAY?

As we find them, they very generally commence to decay in certain places as soon as they come through the gums. It is a common saying with dentists that "children are brought to us too late." We find even the deciduous teeth melting away before the destroyer. It is a fact that often one or more of the second set is hopelessly decayed when first presented to the dentist. As a rule the "toothache" is the first warning. If this was so with "our fathers," why are parents so surprised at it now? Why are they "taken unawares"? Why do they declare "I never heard of such a thing"? Is it a fact that teeth have deteriorated so rapidly?

Of course it is not detected by the owner until it has decayed enough on the *inside* to break away on the *outside*. In fact, it is largely, and perhaps dangerously decayed when the patient can *feel* or *see* it at all.

In some cases the teeth are not affected with caries until induced by some unfavorable change in the general health, which interrupts or cuts off the sources of nutrition to these extremities, endowed with the least degree of vitality, and consequently the first to suffer.

The wise thing to do is to have them inspected once or twice a year to see if the owner is taking good care of them, and at least to prevent decay from making any considerable progress.

WHERE DO THE TEETH DECAY?

This is an interesting question, but to which the patient has probably never given a thought. As may be seen by looking at the teeth they are by nature so constructed as to present depressions between the points or cusps in the crowns (see diagram p. 51). The parts are not united as a solid mass at these places, but are more or less imperfectly joined. The nutritive forces have failed to perfect them up to a warrantable standard. Now these fissures present just the most favorable conditions to invite decay, by affording lodgment for foreign matter, for hiding and protecting from disturbance destructive acids. It may be said that the patient is not in fault for this defect. While proper care may retard, or possibly arrest the destructive process, it is otherwise mainly beyond his control. The dentist is needed here, and will be until certain constitutional changes are effected in coming generations.

The next most vulnerable point of attack is between the teeth, just by the point of contact, on the approximal surfaces. It is comparatively seldom that teeth decay in any other places; the most frequent exceptions being at the cervix or neck on the buccal and labial surfaces; that is, next to the lips and the cheeks.

WHY DO THE TEETH DECAY?

This is the all-important question: no one oftener asked. The true answer is so simple that it gets but little attention. The mind is fixed upon some mysterious cause in the dim distance; the effect of climate; the lack of lime; the influence of the moon; the effect of medicine. But, reader, please come home, right home: stop wandering, stop speculating, and for a few moments face the simple facts. Mischief will hide. The fact that it always hides in certain or given places is evidence that there are accommodations for it. These depressions and fissures in the crowns, even if not accompanied by the imperfections spoken of, are calculated to afford lodgment for food, and matter from the mucous of the mouth, and it is protected by its position from disturbance. Being always warm and moist it readily undergoes those chemical changes which prove so destructive to the teeth. This is a satisfactory answer to the question as regards this class of caries, namely, those in the crowns.

WHY DO TEETH DECAY BETWEEN THEM?
Simply because it is a very convenient place for the lodgment of matter, which, undisturbed, undergoes the change and produces the effect, as in the other locality already discussed. The space is the form of a V, or a triangle, more or less acute, its apex toward the crown of the tooth. In its

normal state it is occupied by the gum. Decay never commences at the point where the two teeth touch, for the simple reason that even the slight movement of the teeth against each other produces sufficient friction to keep that exact spot clean and polished. But right by this spot, at the acute angle, the mischief commences. How forcibly this tells what may and ought to be done by artificial means, that is, keep *all* clean and polished. Once getting a little entrance beneath the surface, the mischief is still farther protected from disturbance, and progresses without being detected by the owner until it has become so weak on the inside as to break away on the outside. The patient is likely to declare that it has just commenced, when on the contrary it is very large, and the commencement dates back to the very first hour of neglect, probably to young years.

The cause of caries upon the buccal and labial surfaces is perhaps as apparent. How often I lift the curtains (lips) and, pointing to the spot, trying at the same time to hold the eye of the owner upon it with a hand-glass, say "please try to be a little more careful at those places." The act of mastication is not so likely to *remove* matter from these localities, the lips and cheeks hold it there, and the results follow as in the other cases. A proper use of the brush would have kept off the evil. And yet the teeth are often injured on these surfaces by harsh brushing or coarse dentifrices.

In brief: The greatest of all causes of decay in teeth is *neglect*—by the parent or the patient, or both. The second perhaps in importance is phy-

sical weakness, a lack of vital force. The third is inherited tendencies.

The first is entirely within our control. The second may in great measure be remedied. Systematic exercise, employment, work; a harmonious development of *body* and mind, does not seem impossible or impracticable. I can only refer to the life of Lewis Carnaro.

The third difficulty we can only endeavor to counteract—unless the County Clerk interposes.

FILLING TEETH.

This is the principal occupation of the dentist, as there is so much of it to be done, and it takes so much time to do it. Its usefulness is as well attested as the usefulness of medicines. The materials used and the manner of using them is somewhat a matter of experiment, as is also the selection and administration of medicines. There is also a reasonable proportion of unsuccessful cases.

The principles involved in the filling of a tooth are very simple viewed superficially, but very complex when studied minutely. To a common observer it is cleaning the bad contents out of a little hole and filling it up again with something better. So far even is very good, and I have a thousand times wondered why persons did not try to do it for themselves. Instead of being a garbage-box (and a cavity in a tooth is only less in size), it presents a clean surface, affording no lodgment for matter. But the dentist has to do so

much more than this that it would be tedious to particularize. Suffice it to say, he must shape the cavity internally with reference to *inserting*, and with reference to *retaining* the filling. He must form it externally with reference to *strength* and *appearance*. He must doctor and disinfect the tooth substance according to the pathological condition in which he finds it. He must select the material with which he fills it with reference to the extent of decay, the density of the tooth substance, the strength of the walls, the proximity of the pulp, the age and general health of the patient; and even the patient's intelligence and habits must be taken into the account. Sometimes the *purse* may have too much control of the case. It is certainly respected in all other transactions. The present mental and physical strength of the patient must be taken into account in the *plan*, and will certainly have its effect in the *performance* of the operation.

On the part of the patient there should be at least a *desire* to have the teeth filled, or not undertake to have it done. It is a fact that some patients go through the operation with a persistent opposition even in the absence of any pain. Some tax the dentist's powers of persuasion as if it was the most important service he was to render, and that for which they pay their money. A little thoughtfulness will make the operation more pleasant, ensure better work, less time and less fee. Some possess the faculty of putting the head back in the same position in the head-rest every time, while others have to be *placed* every time, thus wasting

a good deal of time, protracting the operation, distracting attention from the work, and "mussing the hair." The position of the patient is generally not very uncomfortable; while that of the dentist is constrained and often painful. Yet the dentist is by no means seeking his own comfort, but to secure those conditions which will enable him to do his work in the very best possible manner.

The greatest pain in all dental operations, said to be the very odium of the profession, is that experienced in "excavating" teeth. But this can be quite or nearly prevented, in all but a few exceptionable cases, by the use of the rubber dam, medical treatment (mostly local), and time. The teeth are not likely to be very sensitive with the daily use of a good dentifrice, especially if some extra care is taken to free the cavities from food, etc., and get the powder in them in its stead.

THE FIRST SUMMONS.

It is a very common thing for those persons who have neglected their teeth, to wait until some one is aching more or less, or replying to heat or cold, or to the pressure of food, showing that decay has reached, or nearly reached the pulp; or the owner is alarmed by the sudden breaking away of the weakened walls. Now this is a very unpleasant and embarrassing state of things for the dentist. He is not fond of aching teeth, or of desperately decayed ones. It is doubly embarrassing to have such an introduction; to com-

mence with cases already painful. It can't be expected to make a favorable impression upon the mind of the patient. He is likely to become disgusted, and perhaps discouraged. And, as the operation cannot or should not be completed at the first sitting, he may never return. Then it is unpleasant because the dentist gets neither fee nor thanks, but is in actual disgrace in the estimation of the patient. Such a "customer" is likely to regard all other operations as being as painful, tedious, uncertain, and expensive. Their motto is "I will let them alone as long as they will let me alone." They regard it as the principal part of a dentist's business to attend to aching teeth. It is an unnecessary and undesirable part. Therefore, let such patients be patient with the dentist, and the dentist will be patient with the patient.

It is a wiser plan to treat such ones "gently by degrees," and in the mean time proceed with those which are more simple and easier for both parties, while waiting the result of medicinal and other treatment of the "sicker" ones. When a mouth is presented with some teeth as desperately decayed as those described, it is but reasonable to suppose that others are not far behind in the progress of destruction. Consequently we are likely to find a rather large amount of work to be done. But if the work is well done, and the teeth are reasonably reliable, and the patient takes proper care of them, all subsequent operations needed will be very inconsiderable.

The teeth are so formed, the crowns being larger than the necks, as to protect the necks and gums

in the act of masticating the food, somewhat as the eaves of a house shed off the storm from the sides, or the brim of a hat shades and protects the neck and face below it. It is desirable in filling teeth to leave them this same form, building out and restoring the contour. It is "following nature," and there are many advantages in doing so. But it is an undeniable fact that the dentist does not depend alone upon the filling of the teeth to save them, but he depends upon and presumes the patient will keep them in better condition, guard those places with more care, than formerly; for if the same conditions remain, the same results may be expected to follow. There is no virtue in gold or anything else to prevent it. The tooth substance adjoining the filling is possessed of less vitality, and is at least as likely to succumb to the former destructive conditions. It is reasonable to suppose, however, that the disagreeableness of the operation, the lecture the patient gets while having it performed, and the fee he pays for it, will all help to impress his mind that the conditions must be different from what they were before.

There are many instances where it is wise to change the form, leaving them as we term it "self-cleansing." This is done by changing the point of contact, or leaving a space between the teeth. In case of very frail teeth or a careless owner it is the safer method.

GOLD stands at the head of the list in the estimation of the profession and the public as a material for filling teeth. If we were confined to any

one, gold would unhesitatingly be the choice. Its appearance is not very objectionable even when very much exposed. Its durability is, of course, beyond question ; and its wearing qualities are so good that it never wears out. Its working qualities are such that it is possible to use it in every case, though often with exceeding difficulty, and consequent liability of imperfection. Gold operations being more tedious and expensive, are about the only objections which can be brought against it. No person should delay, much less refuse, to have the teeth filled because they cannot afford to have them filled with gold. It would be as unreasonable as to refuse to wear a coat or dress simply because we cannot have just the kind we want. The teeth may be as surely preserved with other kinds of filling. There are as many failures with gold as with any other material. It requires the highest degree of skill to use it successfully. A poor gold filling is poor indeed.

The dentist has a great variety of preparations of gold for filling teeth, and a considerable variety of methods of manipulating it ; all of which is of interest to the patient, but scarcely within the comprehension of any one without considerable explanation and study.

AMALGAM. We have many preparations under this head. They are composed of a greater or less number of metals, combined in such proportions as to secure certain desirable qualities : such as not to oxydize ; not to shrink or expand ; to set or harden in a convenient time ; and tough enough

not to crumble, and hard enough not to wear away by use.

This filling is valuable for the ease to the patient with which it can be put in place, and also for its durability. In general it can be kept bright, so that it is not unsightly, though it is not recommended for a front view, or for front teeth.

WHITE FILLINGS, or those shaded to more nearly resemble the teeth in color, used in a plastic state, are quite numerous, and answer an excellent but generally temporary purpose. I would sooner, far sooner, have my teeth filled with white wax, and pay for it, than not have them filled at all.

EXAMINING THE TEETH particularly is quite an operation of itself, as difficult and tedious as any other, and should not be required of the dentist as a gratuity. There are a great many mouths, and every mouth may have quite a number of teeth, and every tooth has a number of surfaces, altogether making a considerable demand upon the professor's services, to which we have to add "explanations," "advice," and a "chart."

One of the most unreasonable things a dentist can attempt to do is to try to be very definite as to the extent of decay or the amount of cost before he has "gone to the bottom" of the thing, or even commenced the operation. He can never do it until he can "see through a millstone." It can only be done approximately, a kind of "guess." He cannot even tell how many fillings are required

until the teeth are thoroughly cleaned, every spot removed, to determine whether it is superficial or deeper; and he cannot get between them to examine with certainty until he has "worked his way" there.

HOW MANY FILLINGS may *possibly* be required in a set of teeth can be estimated in the following manner: say there are thirty-two teeth in the mouth, each tooth may be decayed on each approximal surface, making sixty: then each bicuspid is subject to decay in the crown, making eight more: the upper six molars generally decay in two places in each crown, making twelve more: and the under six molars one each: making in all eighty-six fillings.

It is not expected that any one set of teeth will be decayed in all these places, especially at once, yet these are the places where we are all the time filling teeth. As a rule the under six front teeth are exempt; because they are protected on the outside by the lip, and the inside by the tongue, from the sudden changes of temperature, and are more thoroughly and constantly washed by the action of the lip and tongue forcing the fluids between them.

TOOTHACHE.

When decay has reached the dental pulp (see diagram C. p. 53, D), it becomes irritated by external influences, the blood flows in, the vessels become choked, and still more and more pressure

is made in this manner upon the nerves in the dental pulp, and, being confined within the hard walls, gives rise to severe, sharp and shooting pains. If an instrument, a needle or pen-knife point was touched into it through the carious cavity so as to make it bleed, it would probably give immediate relief. The dentist will generally do it without causing pain.

A large number of patients make their first visit to the dentist upon just such a summons as this. They have delayed until one tooth at least is in the agonies of death ; and, if not sacrificed entirely, it is retained at an increased cost of pain, time, expense, and risk. It would seem unnecessary to detail to the general reader what the dentist will have to do with such a "case," and yet, though they are so numerous, he is almost compelled to *tell* the patient what he is about to do before he is permitted to do anything. If the patient will accept *this* telling, the dentist ought to be profuse in his thanks to the writer.

The weaker walls are first broken or cut away to get free access to the carious cavity ; then all loose matter, such as food, berry seeds, and decayed tooth substance, must be removed ; then a regular doctoring process is proceeded with according to the requirements of the case, the first object being to reduce the pain, and then to preserve the vitality of the pulp. If the case yields to treatment, the cavity is filled, the form of the tooth restored, and the case dismissed. But the treatment of all cases of exposed pulps is necessarily experimental, and uncertain in results. At

any time, even years after, the pulp may die, as a result of this first disturbance. Any ordinarily favorable case is worth the trial notwithstanding the risk. These cases are so common that it is important the patient should understand that if there is subsequently any considerable pain or soreness the dentist must have an opportunity to prevent the formation of alveolar abscess, which would be sure to occur if delayed too long.

HOME TREATMENT: Clean out the cavity, put in cotton with oil of cloves; "get in a sweat" with *exercise*. Never use creosote. Spirits of camphor or laudanum may give relief. One half a drop put to the place is sufficient.

ABSCESSSES: ALVEOLAR. (See diagram C. p. 53, I.)

These are caused by the decomposed contents of pulp chambers and canals, by dead teeth and roots. The character of the pain is quite different from that which is caused by the exposure of a pulp. This is more dull and deep-seated, then throbbing; then swelling of the parts, often extensive, until pus has formed, and worked its way out somewhere, which, like opening a boil, gives relief, and the swelling subsides. But the abscess will remain and discharge more or less as long as the tooth is retained, unless the dentist opens and cleans and doctors the chamber, the canals, and the abscess cavity: after which the tooth is filled with some indestructible material, and rendered

useful and comparatively healthy. The success of the treatment of such cases depends in great degree upon general systemic conditions, for which the dentist is in no wise responsible, and over which he has no control. If an abscess cannot be entirely cured without the removal of the offending tooth, as is sometimes the case, it might be tolerated in the upper jaw, but in the under it is positively dangerous, not only to the immediate parts, but to the life of the owner. It requires but little reflection to conceive the mischief which might result from the long retention of effete matter in some "pocket," which it has formed for itself where its presence may not be detected until it has taken on a virulent type.

There is another kind of toothache, very common, called "periodontitis," which means inflammation in the membrane which lines the tooth in its socket. It may result from the death of the pulp, from hypertrophy, from a bruise, from tartar, from an "overhanging filling," or from any nervous disturbance. There is no specific for this trouble, unless it be a counter-irritant, a blister. Yet sometimes heat, sometimes cold, and often some simple application will give relief. A good circulation to the extremities, heating the feet, chafing, or vigorous dancing, will almost surely quiet the pain, and more likely to be a permanent relief. A hard and continuous pressure with the thumb and finger upon the gum each side of the tooth will have a good effect. Dip the end of a stick about as large as a match in oil of cloves, or ammonia, spirits of camphor, or chloroform, and,

with the lip held away and the gums dried with a napkin, apply to the neck of the tooth so that the medicine flows around it. When remedies have all failed and patience is exhausted the tooth may be "excommunicated."

In a case of this kind, if the dentist's previous operations upon that tooth have been what they should have been, he is in no manner responsible for subsequent manifestations, and is entitled to a fee for every time he treats it, just as much as for doctoring a sick child which requires a great deal of doctoring, and perhaps never gets well.

Another kind of toothache is caused by the formation of little nodules of bone or dentine in the pulp-chamber. This trouble cannot be perceived or determined by any external manifestation whatever. The only remedy is to open to the pulp-chamber.

EXTRACTING.

This is a painful and repulsive subject, from every point of view, and to all parties. A few years ago it was a more common practice. Inventive genius was taxed in the construction of instruments for that purpose. But with a rapid acquisition of knowledge and skill, and an appreciation, especially on the part of the "laity," of the importance of preserving the natural teeth, the practice rapidly declined, so that now it is an operation seldom required, except by those who wholly neglect their teeth. Yet it is sometimes

necessary, and to define the cases of necessity is the object of this chapter.

In the case of children's first teeth, when they become loose and irritating, it may be needful to assist nature in their removal.

Dead teeth and roots in a child's mouth are likely to cause much mischief, and should be removed instantly. Any tooth that cannot be put in a clean, healthy, and useful condition, should be removed. In case of a persistent alveolar abscess the offending tooth should be extracted. Sometimes for regulating purposes teeth have to be extracted: but this can only be determined by the dentist. Also, where one or two, or even a few in very bad condition, in the way of an artificial denture. Opinions differ on this last proposition, but apparently only by "extremists."

The most skilful dentist is liable to trouble sometimes in attempting to extract teeth, by reason of the extent of decay, or the form of the roots, firmly implanted in the jaw (see diagram p. 54). Also the patient's movements may result in "breaking the tooth," in spite of all skill and care.

HEMORRHAGE.

If the patient is aware of the liability (the diathesis) the dentist should be informed of the fact, in which case he can take measures to prevent excessive bleeding. If after the extraction of a tooth and leaving the dentist's office the bleeding should continue an unreasonable length of time,

the patient can generally very easily check it by the use of an astringent, such as tincture of nut-galls, or the powder of the same, or alum; or a styptic, tannin, scrapings of leather, cobweb, or even gunpowder. The most convenient is styptic cotton prepared for dentist's use. Whatever is used must be pressed into the socket where the tooth came from; and, if necessary, held there by placing some soft linen or other material folded thick enough to be pressed upon by the opposing teeth. It would seem only necessary to commence treatment soon enough to prevent a strong tendency of blood in that direction. If not arrested within a few hours, send for the dentist—it may be serious to delay.

ANESTHETICS.

Chloroform, ether, nitrous oxide gas, are all efficient anesthetics; generally safe when properly administered and under proper circumstances. None of them are absolutely practically safe. The first and last are theoretically absolutely fearful. They should be used only where the danger would be greater without them. They can be played with only as with "edge-tools" or "fire-arms." Bad results may follow from unforeseen or uncontrollable circumstances. It may be truthfully said in regard to the use of anesthetics that, though harm may not result, it is always within *reach*, if not within *sight*.

THE SIX-YEAR MOLAR. (Dia. p. 51.)

This is the first of the permanent teeth to make its appearance, when the owner is about six years of age. It takes its place back of the ten deciduous teeth. It has the reputation of being more frail than the others, supposed to be the result of causes which affect the general health during the years of its growth. But another very unfavorable circumstance is that it is often sadly neglected before the owner is old enough to be responsible for its care. Consequently the dentist and the patient have a hard struggle to save it. It is not infrequent for this tooth to require five fillings, two in the depressions of the crown, one in the buccal surface, and one on each side where it comes in contact with the others, called the mesial and the distal surfaces. Often, however, we find these teeth as good as any others. But it is a very common thing for them to be brought to the dentist for the first time either aching, or decay so far advanced that the crown is half gone or all hollow. It is desirable if possible to retain them until the jaw is nearly or fully grown. And yet if lost at all it is better to be lost early enough for the others to fill the place, more or less, as they will in time.

How very generally this tooth is supposed to belong to the *first* set. But is that a good excuse for neglecting it? No—the fact is we haven't time, or we have too many other things to attend to. Can't we omit some other things, of less importance?

ARTIFICIAL TEETH.

It is not the present purpose to give a history of the subject; but to call attention to the disadvantages of artificial dentures, so that those persons who have no need of them may make every reasonable effort to avoid the necessity; and that those who do need them may understand what merits they do possess, and the importance of being supplied with them.

The natural teeth sometimes cause so much trouble, and so many people get along so well with artificial ones, as to induce a decision to get rid of the former, and have them substituted by the latter. It must be admitted that there are instances where such a course would be wise. But oftener the individual only goes from bad to worse. It is safer to follow the advice of a good dentist than of a "tooth-puller." Reflect, and make a little calculation. The natural ones can in almost any case, even if quite bad, be put in a comfortable and useful condition. They are firmer, faster, will not "come down," or "tip," like the artificial ones. Estimate how much force it requires to remove a natural tooth, then multiply that by fourteen, and you will realize that it would take the force of a yoke of oxen to pull them out. And why? Because they have large, long, irregular roots, planted deeply in tough, solid bone (diagram p. 54). That is Nature's way of doing it. But what has the dentist to hold in his set of teeth? Nothing more than a man has to hold his hat on

his head. Artificial teeth are held in the mouth either by clasps attached to other teeth (which is not approved), or what is called atmospheric pressure. The teeth are none too comfortable and peaceful when let alone; but it would seem that no one could feel comfortable with something "clasping" or "holding on" to it constantly, unless they get so used to it as not to mind it.

And what is "atmospheric pressure" as applied here? Simply pinching up and holding on to a portion of the skin, the mucous membrane of the mouth, "sucking" it into a cavity or "chamber," and holding it there, that *it* may hold the plate, and the plate hold the teeth. Atmospheric pressure plates will always "tip," or break loose, if the force is applied obliquely, unless prevented by the skilful use of the muscles of the lips, cheeks, and tongue, generally exerted involuntarily and unconsciously. Many persons have the skill or acquire the habit of wearing and using them very quickly; while others, even with as favorable circumstances, make themselves and the dentist a great deal of trouble. It may be a lack of skill, or it may be they are disappointed in their expectations, and are not willing to conform to the new order of things. When we consider the conditions or character of the surface covered by an artificial denture, it is a wonder they can be worn and used with as much comfort as they seem to be. It is a bone foundation, full of knobs, and points, and ridges; covered with tender skin or membrane, full of blood-vessels and sensitive with nerves; some parts soft and yielding, and others hard and

firm. Upon this surface, full of life, and sensitive to the touch, is to be constantly pressed, unevenly and often with violence, a hard and rigid inanimate substance. It must require a great deal of patience. But some persons are entirely too patient. They will persist in wearing a denture when it is hurting, and perhaps doing real harm, "in hopes it would get over it," very innocently, though the dentist has charged them emphatically to call and give him a chance to regulate the case if it needed any attention.

Artificial teeth are subject to accidents. They are likely to be broken by dropping, or while using them. Some of the teeth are frail by reason of their form, or smallness, or the pins by which they are attached to the plate.

These explanations have to be made so often by the dentist that it is a saving of time to make them here.

THE ADVANTAGES, not over natural, but nothing. They can be worn long years with great comfort; and to do very considerable service; and appear natural. They are a real necessity by way of holding the lips, the muscles, and the jaws, in natural position, and also to modulate the voice. These facts are self-evident, and need no explanation. Success is sure in every case with a little patience, perseverance, and skill. They should be supplied as soon as convenient after the loss of the natural ones, to keep the other teeth from changing position, and to hold the soft parts in place. What is called a temporary case is worn

until the usual change in the mouth takes place, which requires from a few months to a year. And even after that time the mouth may undergo so much change as to require a new adaptation. Sometimes the mere fact of a person becoming more or less "fleshy" will cause a perceptible difference in the "fit" of the plate.

Artificial teeth are made to resemble the natural ones so nearly in shape and shade as not to be readily detected by those features. Some slight deviation from "regularity" is desirable in an artistic point of view; but the dentist seems generally to avoid this for fear of some objection or difference of opinion on the part of the patient.

Teeth are inserted on gold, platina, rubber, celluloid, cast metal, and porcelain. They are all good for the purpose, and may be chosen according to the requirements of the case, or the esthetic taste of the patient.

The dentist must possess true artistic skill, cultured by experience, to harmonize the shade of artificial teeth with the complexion, the temperament, and age of his patient; the size, and length, and position with the features and the form.

There is such a general lack of harmony in natural dentures "now days" that it is safer to follow the ideal rather than to try to make them "as mine used to be." Still the dentist is very accommodating, and will try to gratify the taste of his patient.

ERUPTION OF THE TEETH.

The following tables will be convenient for reference.

The first or temporary teeth make their appearance through the gums in about the following order and age: The central incisors, from 5 to 8 months; the lateral incisors, from 7 to 10 months; the cuspids, from 12 to 16 months; the first molars, from 14 to 20 months; the second molars, from 20 to 36 months.

The under ones appear in the same order a little earlier.

The second or permanent teeth appear about as follows: The first molars, one on each side, above and below, from 5 to 6 years; the central incisors, from 6 to 8 years; the lateral incisors, from 7 to 9 years; the first bicuspid, from 9 to 10 years; the second bicuspid, from 10 to 12 years; the cuspids, from 11 to 13 years; the second molars, from 12 to 14 years; the third molars, from 17 to 21 years (see diagram p. 51).

NAMES AND RELATIVE POSITION OF THE TEETH.

The central incisors (1) (see diagram p. 51) are called "central" because they are placed one on each side of the central line of the mouth; and "incisors" because they are designed to incise or cut.

The "lateral incisors" (2) because they are placed one on each side of the central.

The cuspids (3), one on each side, just back of the lateral; called "cuspids" because they have one cusp or point.

The first bicuspid (4), placed first back of the cuspids, and has two cusps.

The second bicuspid (5), same as the first, one remove back.

The first molars (6), next position, many cusps.

The second (7) and third (8) molars in the second and third positions back in the circle.

In the temporary set the order is the same for the six front teeth, but back of them are two molars on each side (which give place to the bicuspid of the next set), making 10 teeth in each jaw.

COMPOSITION OF THE TEETH.

The general anatomy of a tooth is exhibited by the diagram C. p. 53. The microscopic anatomy, while essential and deeply interesting to the dental student, revealing infinite wisdom and beauty, is not necessary to the general reader. Some understanding of the composition of the teeth will assist in their care.

The enamel (see diagram C. p. 53, B) is almost entirely composed of phosphate of lime, about 96 parts in 100. The dentine (c) is about 80 parts in 100 earthy or mineral matter, the rest being animal or organized matter. Subject a tooth to the action of hydrochloric acid and it will dissolve out the lime and leave a soft, almost shapeless mass of gelatinous matter. Subject another to the action of a strong alkali or to fire, and it will take away

the animal portion, leaving the lime framework in its proper form. Fire will produce this effect in a few moments, but the alkali is very slow and superficial in its action, being prevented free access by the hard portion which protects the soft parts. Yet the action is the same, differing in degree, in destroying animal life and animal tissue. The constant use of soap upon the teeth tends to this result.

These hints indicate general principles. We need not be deceived by "exceptions." Lemon-juice will "set the teeth on edge;" which means simply that a portion of the lime has been rapidly dissolved out: and a tooth left in a dish with lemon-juice a few hours will have considerable of its surface softened by it. And yet I know a lady who "slowly sucked the juice of one or more lemons every day for months" with no perceptible effect upon the teeth.

THE MOUTH.

I have tried to avoid the use of technical or scientific terms, and to give as little "anatomy" as is consistent with a clear understanding of the subject we are considering. And yet a brief description of the mouth, if not interesting, may be impressive.

The mouth is confessedly the most complicated part of the human body. It is wonderful in every relation and in every feature. And yet in a popular sense we think of it and look at it only as a "cavity in the head." Viewed externally, it may

to a great extent be relied upon to express thought and feeling, often with more truthfulness than words. We observe first the lips, the curtains of the mouth, susceptible of movements in every possible direction, by the action of bands and bundles of fibres called "muscles." Then as the curtains part we see (or ought to see) the teeth. While the muscles are attached to the various bones of the face and mouth, the teeth are half their length imbedded in bone, and, though immovable, they have much to do with involuntary expression. Next we see the tongue, moving about as if it had a will of its own. Its movements are all produced by the action of muscles most curiously arranged, and like the others, in obedience to nerves which accompany them.

Then we observe the under jaw to move up and down, and from side to side, and to rotate, and back and forward. These movements are produced by another set of muscles, of very great power, in pairs, like the others, but having nothing to do directly with "expression." All the work done by the teeth is by the power of these muscles. All these parts we have mentioned have a solid framework, consisting of quite a number of bones, of curious construction for form and strength. Then we have the arteries to carry nourishment to every part, and the veins to take away the worn-out material; and one set of nerves for *motion*, and another for *sensation* or feeling, and another for *special sense* or taste. Besides the numerous mucous glands, there are six principal ones, arranged in pairs, secreting and pouring into the

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mouth large quantities of fluids, each differing from the others, for special purposes. The lips, teeth, and tongue, regulate the volume of air in speech and song ; all the food we use is received into and partly prepared by the mouth. Its relations and functions are so important that its perfect health is essential to our happiness.

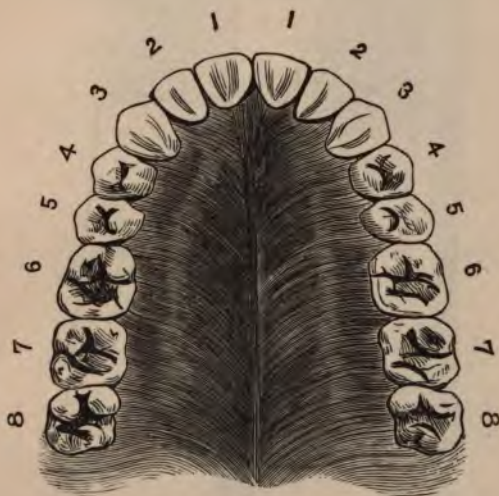
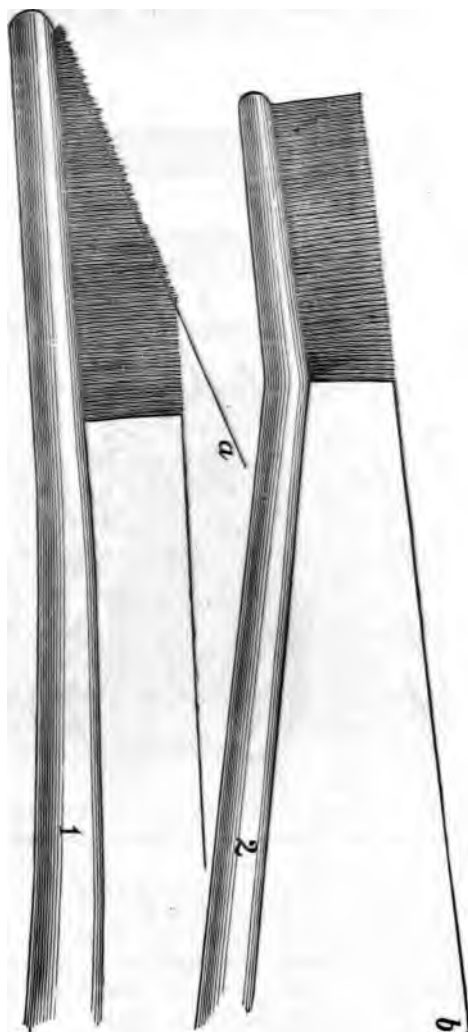
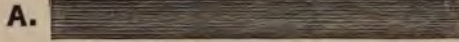


Diagram showing relative size and position of the teeth of the upper jaw: and also the fissures in the crowns. Names found on p. 46.



2. Diagram showing the best form of brush, curved so that the handle is out of the way of the fingers, at *b*.
 showing how a straight-handle brush wears off obliquely as at *a*.



- A. Diagram showing the sharp angles on the bristles of a new brush: magnified.
 B. Showing the same made oval and harmless by wear.



- C. Diagram showing the anatomy of a molar tooth. A, fissure in the enamel. B, enamel. C, dentine. D, pulp chamber. E, septum of bone between the roots, liable to break at G, because the enlarged point F will not pass G, also liable to break at H by reason of the hook. I, abscess.

ITEMS.

A healthy man will consume daily about $2\frac{1}{2}$ pounds of solid food, and over 3 pints of liquid food.

About 80 parts in 100 by weight of the human body is water. The quantity taken daily in food and drink is about $4\frac{1}{2}$ pounds. About 52 per cent is discharged by the lungs (breath) and skin.

The quantity of air taken into the lungs at each inspiration is about 20 cubic inches: about 18 respirations per minute: 350 cubic feet in a day.

The quantity of saliva secreted in 24 hours is about 3 pounds.

The proportion of blood in the body is about 1 to 8; $17\frac{1}{2}$ pounds for a person weighing 140.

The temperature of the blood is $98^{\circ}.6$.

Composition of wheat flour: Gluten, 7.30; starch, 72.00; sugar, 5.40; gum, 3.30; water, 12.00—100.00.

Composition of cow's milk: Water, 870.2; casein, 44.8; butter, 31.3; sugar of milk, 47.7; chlorides of potassium and sodium; phosphates of soda and pottassa; phosphate of lime; phosphate of magnesia; alkaline carbonates; and iron, 6.0—1000.0.

THE PULSE, beats per minute: 1st year, from 115 to 130; 2d year, from 100 to 115; 3d year,

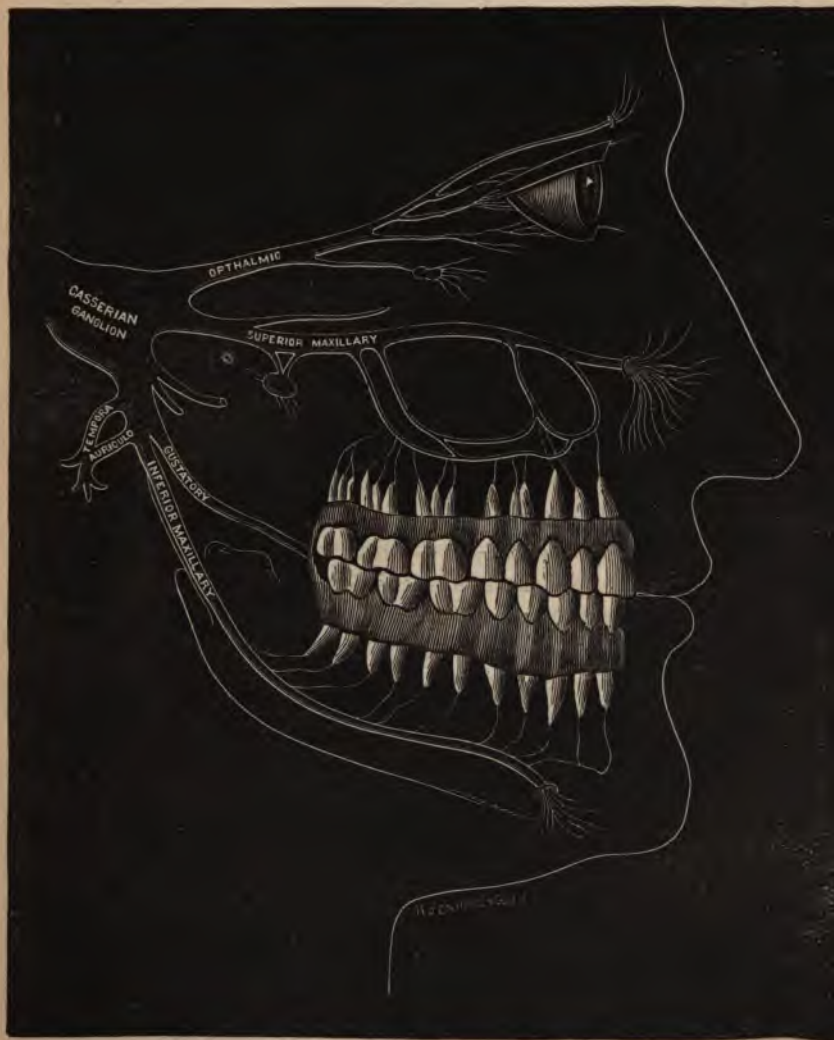


Diagram showing the distribution of nerves to the teeth; and the form and position of the roots of the teeth.

from 95 to 105; 7th to 14th year, from 80 to 90; 14th to 21st year, from 75 to 85; 21st to 60th year, from 70 to 75; old age, from 75 to 80.—CARPENTER.

Animal food is more easily digested than vegetable. The time for stomach digestion varies from one and a half to three hours for various kinds of food. There is as much variation in the digestive ability of the stomach, as in the digestibility of the food.

“The first act to which food is subjected is the mechanical division by the teeth; so important is this in order that it may be influenced by the salivary secretions, that it may be said as an axiom that ‘food well chewed is half digested.’

“As a people the Americans are singularly guilty of life-long and constant infraction of this rule, paying, however, the penalty of dyspepsia, with its numerous train of evils and premature decay.

“When it is remembered what control, for good or for evil, the human race has over these processes, it must be admitted that a knowledge of the physiology of digestion is of the first importance to health and happiness.”—A. N. E.

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